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add that the views expressed are my own.

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REFERENCES

ANON (1998): Forestry Statistics, 1997-1998. Dept. of Environment and Forests, Andaman & Nicobar Administration, Port Blair.
ALI, R., B. AUL & S. KRISHNAN (UNDER PREP): The impact of introduced herbivores on vegetation in the Andaman Islands.
SIVAGANESAN, N. (1993): Report to the Andaman & Nicobar Forest

Department. SACON, 1993.

SIVAGANESAN, N. & AJITH KUMAR (1995): Status of feral elephants in Andamans. Pp. 97-119. In: A Week with Elephants: Proceedings of the International Seminar on the Conservation of Asian Elephants (Edited by Daniel, J.C. & Hemant Datye). Bombay Natural History Society.

4. STATUS AND DISTRIBUTION OF GREY GORAL (*NAEMORHEDUS GORAL*) AND SEROW (*CAPRICORNIS SUMATRAENSIS*) IN KUMAON HIMALAYAS, UTTARANCHAL, INDIA

Introduction

Of the three species of goat antelopes in India, the Grey Goral (*Naemorhedus goral*) and the Serow (*Capricornis sumatraensis*) – are found in Kumaon Himalayas (Prater 1997). The Grey Goral is widely distributed from low to medium altitude, while the Serow is restricted to higher altitude zones. The Kumaon Himalayas comprising Almora, Pithorgarh and Nainital districts in Uttar Pradesh, India, cover an area of about 21,000 sq. km. (28° 43' 55"–30° 30' 12" N and 78° 44' 30"–80° 45" E) (Fig. 1). They were once covered with extensive tracts of oak forest (*Quercus* spp.), but clearance of forest and changes in land use pattern by man during the last two centuries have led to the fragmentation of the oak forest. Large areas have been replaced either with Chir Pine (*Pinus roxburghii*) or terrace cultivation.

The large-scale changes in the Kumaon Himalayas have impacted the animal community, especially the goat antelopes. The populations of goat antelopes have been confined to small oak patches and no information is available on the present status and distribution of the two species in Kumaon Himalayas. Considering this we conducted extensive surveys throughout the Kumaon Himalayas to document the present status of the Grey Goral and the Serow in extant oak patches.

Study area

The Kumaon Himalayas present a variety of habitat types ranging from moist deciduous forests at lower

altitudes in the Siwalik hills to alpine meadows at higher reaches of the Himalayan mountains. Extensive tracts of

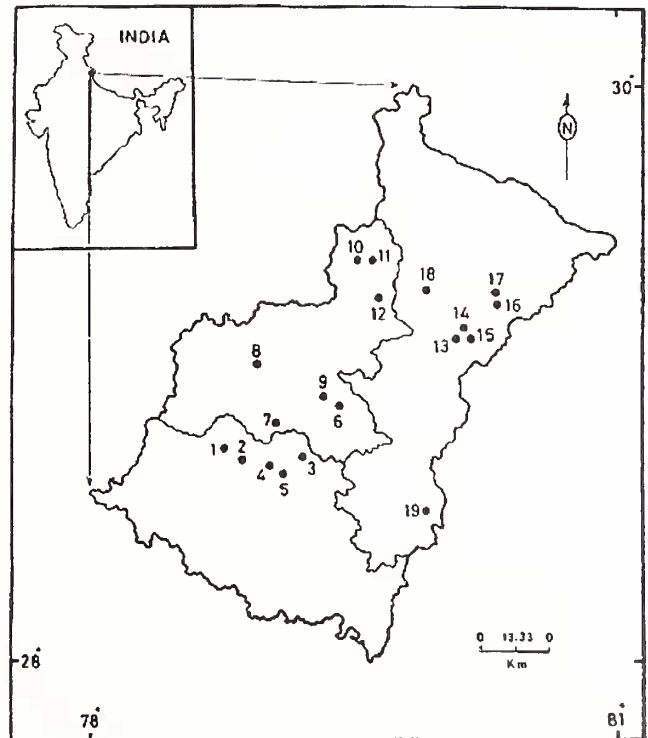


Fig. 1: Map showing location of the surveyed sites

Shorea robusta (Sal) forest dominate the Siwalik hills and extend up to an altitude of 1200 m (Saxena *et al.* 1985). Beyond this, pine forests dominate the landscape up to 2400 m. Oak forests occur at middle altitude of Himalayan hills, between 1300 m and 3200 m. The temperate broad leaf forest that includes species such as *Taxus baccata*, *Tsuga dumosa* and *Betula utilis* occur between 3200 m and 3500 m, above this altitude lies the alpine zone dominated by shrubs and grasses.

Methodology

Nineteen sites were selected in Kumaon for investigating the current status of goat antelopes (Fig. 1). Surveys were conducted during pre- and post-monsoon in 1997. The data collected on the status and distribution of ungulate species included direct sightings and indirect evidences such as pellet groups along the existing forest trails. The length of forest trails varied from 1-1.5 km. During the surveys, at each site, existing forest trails were monitored on a daily basis in morning hours to gather data on the status of different ungulate species. Since direct sightings of animals were few, data on pellet groups along the forest trails were also collected. Pellet groups of each species were counted in 10 m radius circular plot established at 100 m intervals. These plots were established at 10 m on either side of the trails to avoid sampling of relatively disturbed vegetation along the trails. A total of 634 such plots were sampled in 19 sites. Pellet groups of the two species (Grey Goral and Serow) were distinguished on the basis of shape, size and colour, which differed markedly between the species.

The sightings of different ungulate species were used to calculate encounter rates in terms of 100 hours of observations. The number of pellet groups for each species in each plot was used to calculate pellet group density (pellet groups/ha \pm SE) for each species using the formula:

$$\text{Pellet group density/ha} = \frac{\text{No of pellet groups}}{\text{Plot area}} \times 10,000$$

Grey Goral: The direct sighting of the Grey Goral was recorded from 5 surveyed sites and indirect evidences from 13 sites (Table 1). Grey Goral encounter rate was highest in Kunjakharak (54.5 groups/100 hours) followed by Binsar (17.81), Binayak (9.5), Maheshkhan (7.8) and Gandhura (5.08). Pellet group density of goral was highest at Kunjakharak (68.4 \pm 19.0) and lowest at Gandhura (1.03 \pm 1.0). The overall pellet group density was 8.8 \pm 0.64. Grey Goral prefer open

cliffs and steep grassy slopes, they predominantly graze, and sometimes feed on herbs and acorns of Oak (*Quercus* sp.) (Orus 2001).

Serow: We did not have direct sighting of the Serow, but pellet groups were recorded from three sites: Sunderdhunga, Pindari and Munsiyari. It lives solitarily or in pairs and is generally encountered in birch forest above the pine zone. It prefers high altitude with low tree cover, but good shrub ground cover. Pellet group density was highest (12.0 \pm 6.3) at Sunderdhunga and lowest (2.38 \pm 1.7) at Pindari. Overall pellet group density was 0.88 \pm 0.64. Serow is regularly poached for meat.

The Serow occurs at higher altitude areas (> 1850 m) and therefore has restricted distribution in Pindari, Sunderdhunga and Munsiyari. The Grey Goral, whose distribution covers low and middle altitude areas, has disappeared from certain patches. In general, however, there were very few direct sightings of both the species, which suggests very low density of these species. While changes in land use pattern have drastically reduced the distribution of goat antelopes species, the extremely low density in the forest patches has been due to high poaching pressure. During the surveys, poaching was found to be common

Table 1: Direct sightings and pellet group density (pellet groups/ha \pm SE) of Grey Goral and Serow recorded at different sites surveyed in Kumaon Himalaya

Site name	Site code	Altitude range	Goral	Serow
Kunjakharak	1	1900-2400	68.4 \pm 19.0*	00.0 \pm 0
Binayak	2	1900-2500	8.49 \pm 3.0*	00.0 \pm 0
Mukteshwar	3	1500-2300	00.0 \pm 0	00.0 \pm 0
Gager	4	1700-2300	2.12 \pm 1.4	00.0 \pm 0
Maheshkhan	5	1900-2300	00.0 \pm 0*	00.0 \pm 0
Jageshwar	6	1900-2100	00.0 \pm 0	00.0 \pm 0
Sitlakhet	7	1900-2100	00.0 \pm 0	00.0 \pm 0
Pandavkholi	8	1800-2500	16.7 \pm 5.0	00.0 \pm 0
Binsar	9	1500-2400	19.6 \pm 10.7*	00.0 \pm 0
Sunderdhunga	10	2500-3500	1.82 \pm 1.2	12.0 \pm 6.3
Pindari	11	2300-3500	2.38 \pm 1.7	2.38 \pm 1.7
Gasi	12	2300-2900	5.57 \pm 3.5	00.0 \pm 0
Gandhura	13	1500-2600	1.03 \pm 1.0*	00.0 \pm 0
Daphiyadhura	14	1300-2440	14.0 \pm 3.8	00.0 \pm 0
Majtham	15	1300-2700	9.55 \pm 4.0	00.0 \pm 0
Duku	16	2100-3500	0.0 \pm 0	00.0 \pm 0
Sobla	17	1900-3500	16.7 \pm 5.2	00.0 \pm 0
Munsiyari	18	2100-2200	00.0 \pm 0	2.55 \pm 2.5
Mechh	19	2100-2200	1.59 \pm 1.5	00.0 \pm 0

Status = * = direct sightings

throughout Kumaon, including in established protected areas (Khan 1998).

Conservation problem: Due to excessive dependency of the local people on oak patches for fuel wood, fodder and timber, the forests are getting degraded and are shrinking in size. Moreover, the pine forests are encroaching the oak forests, which is not a good sign for the Grey Goral and the Serow habitat.

The other major threat is poaching of wildlife, which is widespread throughout Kumaon. Poaching is highest in the Sunderdhunga, Pindari and Munsiyari areas where locals hunt the Grey Goral and the Serow for meat. In Pithoragarh district, hunting pressure is very high towards the Askot Wildlife Sanctuary, as international boundaries with Nepal and Tibet meet in this area. This is also an old trade route. These routes are still being utilised for poaching animals such as Musk Deer *Moschus chrysogaster* (Hodgson) and the Himalayan Black Bear *Ursus thibetanus* (G. Cuvier.)

Conservation strategy: In Kumaon Himalayas, there are only two wildlife sanctuaries, i.e. Binsar and Askot, which together cover about 645 sq. km. Both sanctuaries have very high anthropogenic pressures. Binsar is just 45 sq. km in size.

Both sanctuaries conserve only the Grey Goral leaving the Serow unprotected. In order to conserve both species, the protected area coverage must be increased. Areas such as Kilbary, Binayak and Kunjakharak in Nainital and Pindari and Sunderdhunga region in Almora district have very high conservation potential and therefore should be declared as protected areas. There is also a need for placing some regulation on cutting and lopping of trees and grazing. A better control of poaching in the remaining unprotected oak patches is also needed.

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REFERENCES

- KHAN, J.A. (1998): Conserving biodiversity: The Himalayan challenge. *WWF India Network Newsletter* 9(3): 5-10.
- ORUS, I. (2001): Status and distribution of ungulates in Kumaon Himalayas with special reference to aspects of ecology of goral *Naemorhedus goral* and Barking Deer *Muntiacus muntjak*, Kumaon Himalayas, India. Unpublished thesis, Aligarh Muslim University, Aligarh, UP, India. 281 pp.
- PRATER, S.H. (1997): *The Book of Indian Animals*. Bombay Natural History Society, Mumbai. 324 pp.
- SAXENA, A.K., T. PANDEY & J.S. SINGH (1985): Altitudinal variation in the vegetation of Kumaon Himalayas. Pp. 45-65. *In: Perspective in Environment Botany* (Ed: Raoreval, D.N.). Print House, Lucknow.

5. RECORD OF THE CHINESE GORAL *NAEMORHEDUS CAUDATUS* IN ARUNACHAL PRADESH¹

Introduction

Ungulates are believed to be amongst the best documented taxa of large wildlife, with only ten new species being described between 1930 and 1994 (Pine 1994). Yet, the past decade saw a spate of ungulate discoveries in Southeast Asia, with four species new to science being described between 1994 and 1998 (Schaller and Vrba 1996; Giao *et al.* 1998; Rabinowitz *et al.* 1998; Amato *et al.* 1999). These new discoveries reflect the hitherto poor status of exploration and documentation of wildlife in the remote Southeast Asian forests. In India, the wildlife of the northeastern state Arunachal Pradesh (26° 28'- 29° 30' N and 91° 30'- 97° 30' E; 83,743 sq. km) has remained poorly documented. One of our surveys in 2002 recorded the Leaf Deer *Muntiacus putaoensis* in Arunachal (Datta *et al.* 2003), a new species that was first

found in the adjoining forests of Myanmar in 1997 (Rabinowitz *et al.* 1998; Amato *et al.* 1999). This record of the Leaf Deer in the mid-elevation forests of Eastern Arunachal is so far the only new addition to the list of large mammals of the Indian subcontinent in the last century (Datta *et al.* 2003).

Arunachal Pradesh is situated in the transition zone between the Himalayan and Indo-Burmese regions (Mani 1974; Rodgers and Panwar 1988). The entire state is part of the Eastern Himalayan global biodiversity hotspot (Mittermeier *et al.* 1998; Myers *et al.* 2000) as well as among the 200 globally important eco regions (Olson and Dinerstein 1998). Most wildlife surveys in Arunachal have so far been restricted to low and mid-elevation forests (Katti *et al.* 1992; Athreya *et al.* 1997; Kumar and Singh 1999; Pawar and Birand 2001; Datta *et al.* 2003). Apart from a recent survey of